

What is claimed is:

1. A chip on board package, comprising:
 - a ball grid array substrate;
 - a die spaced from the substrate;
 - a wire bond electrically connecting the die to the substrate; and
 - a void extending intermediate the die and the substrate.
2. The package of claim 1, wherein the substrate includes a support elevating the die above the substrate to create the void.
3. The package of claim 1, wherein the substrate includes an adhesive layer in contact with the die, a spacer, and a paste layer, and wherein the void is inwardly bound by the adhesive layer, the spacer and the paste layer.
4. The package of claim 1, wherein the void extends under one side of the die.
5. The package of claim 1, wherein the void extends under the periphery the die.
6. The package of claim 1, wherein the void extends under an outer portion the die.
7. The package of claim 1, wherein the void is a recess.
8. A chip on board package, comprising:
 - a ball grid array substrate;
 - a die;
 - a support connecting the die to the substrate;

a wire bond electrically connecting the die to the substrate; and
a void extending intermediate the die and the substrate.

9. The package of claim 8, wherein the support is inwardly spaced from a periphery of the die, the support forming a closed end of the void.
10. The package of claim 8, wherein the die includes a first dimension, the support includes a paste layer that has an initial, non-bleed out dimension and an assembled, bleed out dimension, the non-bleed out dimension existing before the die and substrate are joined, the bleed out dimension occurring after the die and substrate are joined, both the non-bleed out dimension and the bleed out dimension being less than the first dimension, and the bleed out dimension extending into the void.
11. The package of claim 10, wherein the support includes a spacer having a second dimension that is less than the first dimension.
12. The package of claim 11, wherein the second dimension is less than the bleed out dimension.
13. The package of claim 12, wherein an encapsulant is in the void.
14. The package of claim 12, wherein the encapsulant fills the void.
15. A chip on board package, comprising:
 - a ball grid array substrate;
 - a die having a bottom surface;
 - an adhesive layer on the bottom surface;
 - a support connecting the adhesive layer to the substrate;

a wire bond electrically connecting the die to the substrate; and
a void extending intermediate the die and the substrate.

16. The package of claim 15, wherein the support is inwardly spaced from a periphery of the die, the support forming a closed end of the void.

17. The package of claim 15, wherein the die includes a first dimension, and the support includes a paste layer that has a non-bleed out dimension and a bleed out dimension, both the non-bleed out dimension and the bleed out dimension are less than the first dimension.

18. The package of claim 17, wherein the bleed out dimension defines an area of the paste layer, the area of the paste layer is less than an area of the bottom surface.

19. The package of claim 15, wherein the support includes a spacer having a second dimension that is less than the first dimension.

20. The package of claim 19, wherein the second dimension is less than the bleed out dimension.

21. The package of claim 15, wherein an encapsulant is in the void.

22. The package of claim 15, wherein the encapsulant fills the void.

23. The package of claim 15, wherein the adhesive layer has an adhesive layer surface area, and the support includes a paste layer that has a bleed out area the bleed out area is less than the adhesive surface area.

24. A chip on board package, comprising:
a ball grid array substrate having a first substrate surface with at least one first contact;
a die having a first die surface with at least one second contact;
a support connecting the die to the substrate, the support being inwardly spaced from the at least one first contact;
at least one wire bond electrically connecting the at least one first contact to the at least one second contact; and
a void extending intermediate the die and the substrate.
25. The package of claim 24, wherein the support includes a spacer, and an adhesive layer connected to a second die surface and the spacer.
26. The package of claim 25, wherein the spacer and the support are positioned inwardly of the at least one first contact.
27. The package of claim 26, wherein the support includes a paste layer intermediate the spacer and the first substrate surface.
28. The package of claim 24, wherein the substrate includes a second substrate surface and at least one ball contact on the second substrate surface.
29. A chip on board package, comprising:
a substrate having a first substrate surface with at least one first contact and a second substrate surface with at least one second contact;
a die having a first die surface with at least one third contact;
a support connecting the die to the substrate, the support being inwardly spaced from the at least one first contact;

at least one wire bond electrically connecting the at least one first contact to the at least one third contact; and

a void extending intermediate the die and the substrate and outwardly of the support.

30. The package of claim 29, wherein the void extends around the periphery of the support.

31. The package of claim 29, wherein the support includes an adhesive layer connected to a second die surface of the die.

32. The package of claim 31, wherein the adhesive layer is connected to the first substrate surface.

33. A method, comprising:
connecting a wire bond from a die to a substrate within an outer portion of the substrate, the outer portion having a width of about a half millimeter.

34. The method of claim 33, wherein the connecting the wire bond includes connecting a first end of the wire bond to a contact of the die.

35. The method of claim 34, wherein the connecting the wire bond includes connecting a second end of the wire bond to a contact of the substrate.

36. The method of claim 33, wherein the connecting the wire bond includes connecting the wire bond to an outer portion that is on the top surface of the substrate.

37. The method of claim 33, wherein connecting the wire bond includes connecting the wire bond to a contact in the outer portion of a top surface of the substrate, which outer portion is free from paste bleed-out.
38. The method of claim 37, further including connecting the die to the top surface of the substrate.
39. A method of connecting a die to a substrate, comprising:
providing an adhesive on a surface of the die;
providing a support on the adhesive;
providing a paste on the substrate;
positioning the support on the paste such that the paste remains completely beneath the die.
40. The method of claim 39, wherein providing adhesive includes providing adhesive to have essentially the same surface area as the surface of the die.
41. The method of claim 39, wherein providing support includes providing a support that has an element with a surface area smaller than the die.
42. The method of claim 39, wherein providing support includes providing a spacer that has a spacer surface area smaller than a surface area of the die.
43. The method of claim 42, wherein providing a support includes providing an insulative support.
44. The method of claim 39, wherein providing a paste on the substrate includes providing a flowable paste.

45. The method of claim 39, wherein the steps are performed in the recited order.
46. The method of claim 45, wherein positioning the support on the paste includes pressing the support and substrate together so that the paste bleeds out from under the support.
47. A method of connecting a die to a substrate, comprising:
providing an adhesive on a surface of the die;
providing a support on the adhesive;
providing a paste on the support on its side free of the adhesive;
pressing the die and support assembly onto the substrate while keeping the paste completely beneath the die.
48. The method of claim 47, wherein providing adhesive includes providing adhesive to have essentially the same surface area as the surface of the die.
49. The method of claim 47, wherein providing support includes providing a support that has an element smaller than the die.
50. The method of claim 47, wherein providing support includes providing a support that has a spacer smaller than the die.
51. The method of claim 50, wherein providing a support includes providing an insulative support.
52. The method of claim 47, wherein providing a paste on the support includes providing a flowable paste.

53. The method of claim 47, wherein the steps are performed in the recited order.
54. The method of claim 47, wherein pressing the die and support assembly includes pressing the die and support assembly and substrate together so that the paste bleeds out from under the support.
55. A method of connecting a die to a substrate, comprising:
providing an adhesive on a first surface of the die;
providing a support on the adhesive;
providing a paste on at least one of the support on its side free of the adhesive and a surface of the substrate;
pressing the die and support assembly onto the substrate while keeping the paste completely beneath the die;
wire bonding pads on a second surface of the die to contacts on the substrate;
and
encapsulating the die.
56. The method of claim 55, wherein providing a support includes providing a support that is smaller than the die to provide a void beneath the die into which the paste can bleed into without extending beyond the edge of the die and without contacting the substrate contacts.
57. The method of claim 56, wherein providing paste includes providing paste in an area equal to an area of the support.
58. A method of connecting a die to a substrate, comprising:
providing a substrate having contacts positioned less than about 0.38 millimeters outwardly from the die

providing an adhesive on a first surface of the die;
providing a support on the adhesive;
providing a paste on at least one of the support on its side free of the adhesive and a surface of the substrate;
pressing the die and support assembly onto the substrate while keeping the paste completely beneath the die;
wire bonding pads on a second surface of the die to contacts on the substrate.

59. The method of claim 58, further comprising encapsulating the die.

60. The method of claim 59, wherein the encapsulating includes positioning an edge of the encapsulant less than 1.0 millimeter from an edge of the die.

61. The method of claim 59, wherein the encapsulating includes positioning an edge of the encapsulant less than about 0.75 millimeter from an edge of the die.

62. The method of claim 59, wherein the encapsulating includes positioning an edge of the encapsulant less than about 0.5 millimeter from an edge of the die.

63. A method of forming a packaged integrated circuit, comprising:
forming an integrated circuit in a die;
fixing the die on a substrate, wherein fixing includes elevating the die above the substrate on a support, adhering the support to the substrate and limiting paste bleed-out to beneath the die; and
electrically connecting the integrated circuit to the substrate.

64. A method of fabricating a chip-on-board package, comprising attaching a die to a substrate such that paste bleed-out remains beneath the die to either reduce package size or increase die size.

65. A method of packaging a die, comprising:
providing a die having a first area;
connecting a spacer having a second area to the die, wherein the second area is smaller than the first area;
pasting the spacer to a substrate while keeping all of the paste beneath the die.
66. The method of claim 65, further including positioning an edge of the die closer to an edge of the substrate while increasing a distance between a paste and a contact on the substrate.